Correlations in a one-dimensional lattice gas Si(111) 5x2-Au

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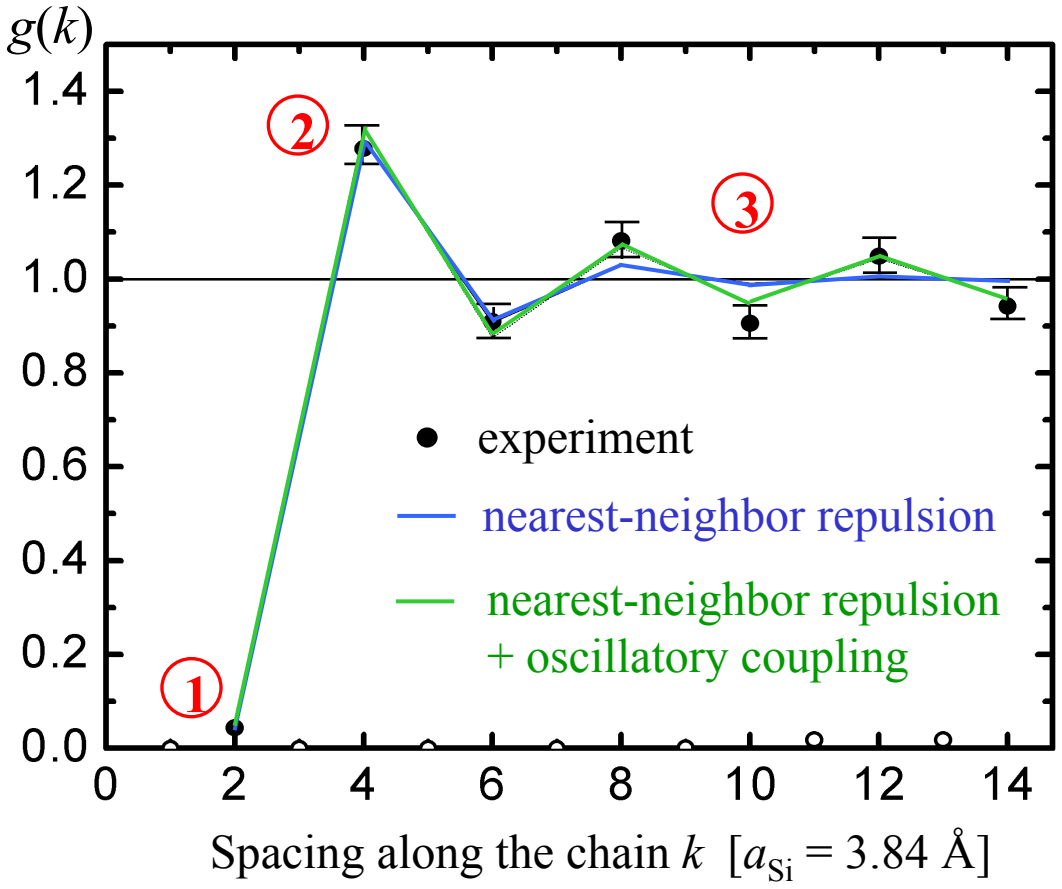

A possible atomic scale memory can be composed of atoms on a surface lattice. The memory unit is the presence or absence of the extra atom. Correlations of adjacent atoms impose a fundamental limit on the memory density. The graphic shows identification of the principle features of the correlations for a chain structure on a silicon surface.

Nearest-neighbor repulsion explains ① and ②, but not ③

Nearest-neighbor repulsion
+ oscillatory coupling:

μ = -21.0 meV, J_1 = **217 meV,**
A = **1.26 meV** For T = 700 K

This work was a collaboration of theory and the experiments of F.J. Himpsel DMR 0079983